STATE OF COLORADO

Colorado Water Conservation Board
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TO: Colorado Water Conservation Board Members

FROM: Joe Busto
Watershed Protection and Flood Mitigation Section

DATE: November 5, 2012

SUBJECT: **Agenda Item 17a, November 13-14, 2012 Board Meeting**
Finance – Construction Fund Referred Non-Reimbursable Investment
Rio Grande Forecasting Development Projects

Introduction and Discussion

Forecasting of water supply is important to Colorado's water rights system, compact obligations, and beneficial use of water. These errors can result in impacts in the tens of millions of dollars per year. The April 1 forecast is used for surface water administration and recently for ground water modeling for administration, thus making the need for increased accuracy even greater. At the July and September CWCB meetings, staff and NOAA-National Severe Storms Lab updated the Board about a multi-agency effort to develop five projects in the Rio Grande to help minimize forecast errors.

Two projects were identified for funding by staff. Project #1 is a Compact Compliance Tool to develop and interpret hydrographs and runoff scenarios to identify the probability of meeting compact obligations for $65,000. This was the highest priority for NWS West Gulf River Basin Forecast Center. Also highlighted was Project 5, which is coupling mobile radar data to snowpack and hydrologic models to conduct sensitivity tests and comparisons from existing and proposed methods. This project uses $150,000 in CWCB funds and seeks matching federal funding. It is proof of concept project and a bold step into the future by creating new precipitation products and modeling for forecasts. Current methods rely on SNOTELs and simple snow modeling. It also builds a business case for more radar. How much precipitation fell is important needs to be answered and until then we will get our streamflow forecasts by tweaking precipitation inputs into our hydrologic models to get the right answers. Complete observational coverage through gap filling radars will lead to better management decisions. The Conejos WCD is the local Project Sponsor of this effort along with funding and support from other Rio Grande water users. State and local funding will be used as match to apply for federal funding through NOAA and the "Science Need 4" category of USBR Southern Rockies Landscape Conservative Cooperative.

Staff Recommendation

Staff recommends that the Board request that the General Assembly authorize up to $215,000 from the Construction Fund to be appropriated to the Colorado Water Conservation Board for Rio Grande Forecasting Development Projects.

Water Project Construction Program - Project Data
Non-Reimbursable Investment

Grantee: CWCB & NOAA **County:** Alamosa, Rio Grande

Project Name : Rio Grande Water Supply Forecasting Development Projects

Project Type: New tools and modeling for water supply forecasts in the Rio Grande with statewide implications

Drainage Basin: Rio Grande **Water Source**: Rio Grande and Conejos Rivers

Total Project Cost: $365,000 **Funding Source**: CWCB Const. Fund

Type of Grantee: NOAA/NWS **CWCB Non-Reimbursable Inv.:** $215,000

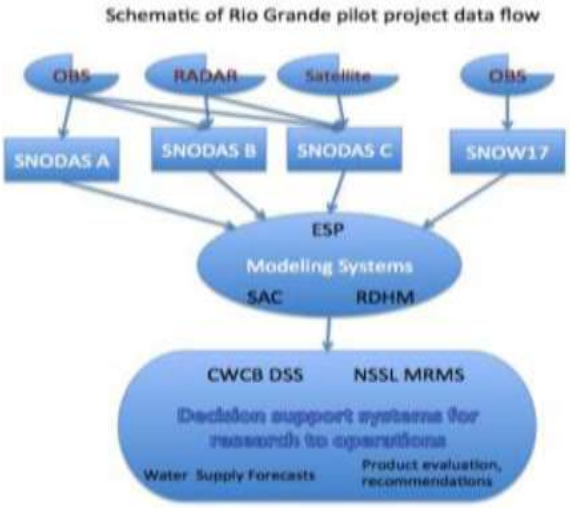
SUMMARY

The CWCB and NOAA presented at the July CWCB meeting in Gunnison to highlight previous work by the CWCB to develop new datasets and modeling for water supply forecasts. In the past seven years, the forecasts have shown forecast errors up to 24% of the river volume in the Rio Grande basin, creating issues for water rights administration, compact compliance, and beneficial use of water within the basin.

Rio Grande at Del Norte	June Forecast Water Supply [ac-ft]	Actual Water Supply [ac-ft]	Forecast Error June Forecast – Actual [ac-ft]
WY2005	795,000	683,000	+112,000 (16%)
WY2006	350,000	412,000	-62,000 (-15%)
WY2007	450,000	593,000	-143,000 (-24%)
WY2008	655,000	623,000	+32,000 (5%)
WY2009	490,000	513,000	-23,000 (-4%)
WY2010	485,000	455,000	+30,000 (+7%)

In August of 2011, a team of agencies was convened to look at water supply forecasting projects that might increase forecasting accuracy. The team consisted of experts from Riverside Technologies, National Center for Atmospheric Research, Portland Natural Resources Conservation Services, National Weather Service, CWCB staff, and the National Oceanic Atmospheric Administration.

Five projects were developed by this team and ranked one through five by the National Weather Service. These projects included:
Project 1 – DSS Compact Compliance Tool
Project 2 – Generate Historic Forecasts
Project 3 – SCA, Snow-17, SNODAS
Project 4 – Enhanced Ground Observation Network, Radar & Distributed Models.
Project 5 – Radar estimated precipitation and hydrologic modeling



Staff believes that even though all five projects proposals are worthy, the state should balance the short term need in the Rio Grande (Project 1) with the long term needs for the state (Project 5). Project 1 will assist DWR with tracking forecasted runoff to actual runoff for use in evaluating the likelihood of meeting compact compliance in the Rio Grande basin. Project 5 will examine results from four snow models and two hydrologic models to make eight different combined forecasts. The project will examine which scenarios produce more accurate forecasts. The graphic shows the data flow as developed for the project. This will closely examine the forecasting process, the existing models, potential new data sources, and new models to see if value can be added to the traditional basin runoff forecasting process.

This request is to fund Projects 1 and 5 as outlined above. The cost of Project 1 is $65,000. The cost of Project 5 is $300,000. The intent is to leverage $150,000 of funding with a request for matching federal funds for Project 5. Projects 2, 3, and 4 are not being requested for funding.